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| 10/520,497      | 09/14/2005  | Huazhong Shi         | 023070-127310US     | 9783             |

20350 7590 11/16/2007  
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| EXAMINER |
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BUI, PHUONG T

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| ART UNIT | PAPER NUMBER |
|----------|--------------|

1638

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| MAIL DATE | DELIVERY MODE |
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11/16/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



## Office Action Summary

**Application No.**

10/520,497

**Applicant(s)**

SHI ET AL.

**Examiner**

Phuong T. Bui

**Art Unit**

1638

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 8/27/07.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 14, 15 and 17 is/are pending in the application.
- 4a) Of the above claim(s) 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/12/05</u> .  | 6) <input type="checkbox"/> Other: _____                          |



### **DETAILED ACTION**

1. The Office acknowledges the receipt of Applicant's restriction election filed August 27, 2007. Applicant elects Group III and SEQ ID NO:9 without traverse. The Office inadvertently grouped Claim 17 into Group III since claim 17 recites "The polynucleotide according to claim 10". However, claim 10 is drawn to a method and not to a polynucleotide. Furthermore, claim 10 has been canceled. Accordingly, claim 17 is withdrawn as being drawn to a non-elected invention. Claims 14, 15 and 17 are pending. Claims 14 and 15 are examined in the instant application. This restriction is made FINAL. Since SEQ ID NO:2, 9 and 10 were disclosed in provisional application 60/395662, Applicant's earliest priority benefit date is July 12, 2002.

### ***Drawings***

2. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the drawings submitted are informal drawings. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

### ***Specification***

3. The disclosure is objected to because of the following informalities: the sequences on page 14 of the specification do not comply with 37 CFR 1.821-1.825. These sequences must be identified by SEQ ID NO. identifiers.

Appropriate correction is required.



***Claim Rejections - 35 USC § 112, second paragraph***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 recites "comprising" and "fewer than 522 amino acids". It is unclear what size nucleotide sequence is being claimed as "comprising" is open language, but "fewer" sets an upper limit.

It is unclear whether "80% identical" refers to structure or function. It is suggested that "identical" be amended to "sequence identity".

"Increased" is a relative term lacking a comparative basis.

Clarification and/or correction is required.

***Claim Rejections - 35 USC § 112, first paragraph***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claim 14 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for SEQ ID NO:9, does not reasonably provide enablement for 80% identical to SEQ ID NO:2 and fewer than 522 amino acids. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in



scope with these claims. "80% identical and fewer than 522 amino acids" is not enabled because it encompasses unspecified base substitutions, deletions, additions, and combinations thereof while enhancing salt tolerance in a plant. One skilled in the art would not be able to predictably determine which sequences from the claimed genus of sequences would result in enhanced salt tolerance. Table 1 shows that some mutations decrease its salt tolerance properties, and some increase, but it is unpredictable based upon the working examples which mutations would increase activity. Moreover, while one skilled in the art can readily make mutations to SEQ ID NO:2, further guidance is needed as to how inoperable embodiments can be readily eliminated without undue experimentation. Neither the state of the prior art nor Applicant's disclosure provides guidance as to what regions of SEQ ID NO:2 must be retained or what regions should be modified to enhance activity. Accordingly, the claimed invention cannot be practiced without excessive and undue experimentation as commensurate in scope with the claims.

***Claim Rejections - 35 USC § 112, first paragraph***

8. Claim 14 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the **written description** requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The "80% identical and fewer than 522 amino acids" lacks adequate written description because Applicant does not disclose a representative number of species as encompassed by these claims. The claim



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encompasses mutants and allelic variants and thus imply that structural variants exist in nature, yet no structural variant has been disclosed. The claim also encompasses Na<sup>+</sup>/H<sup>+</sup> transporter polypeptide sequences from other species. The implication is that there is a gene and a protein other than that disclosed which exists in nature, but the structure thereof is not known. Applicant does not disclose any sequence having 80% sequence identity with SEQ ID NO:2 and fewer than 522 amino acids having enhanced salt tolerance properties. Thus, there are insufficient relevant identifying characteristics to allow one skilled in the art to predictably determine such mutants, allelic variants and Na<sup>+</sup>/H<sup>+</sup> transporter polypeptide sequences from other plants and organisms, absent further guidance. Accordingly, there is lack of adequate description to inform a skilled artisan that Applicant was in possession of the claimed invention at the time of filing. See Written Description guidelines published in Federal Register/ Vol.66, No. 4/ Friday, January 5, 2001/ Notices; p. 1099-1111.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Gaxiola et al. (PNAS, Vol. 96, No. 4, pp. 1480-1485, Feb 1999 (U)). The open language in claims 14 and 15 reads on the full-length sequence of SEQ ID NO:2.



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Gaxiola teaches SEQ ID NO:2 (AtNHX1), which encompasses SEQ ID NO:9.

Accordingly, Gaxiola anticipated the claimed invention

**Remarks**

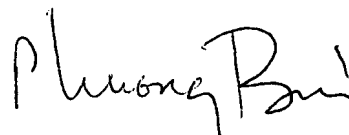
11. No claim is allowed.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong T. Bui whose telephone number is 571-272-0793.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on 571-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

10/30/07



Phuong T. Bui  
Primary Examiner  
Art Unit 1638